

NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL

COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS
Board on Physics and Astronomy

FINAL TECHNICAL PROGRESS REPORT
to the NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

I. Project Identification

Project Title: Board on Physics and Astronomy
Agency Award No.: NAGW-3835
Reporting Period: October 1, 1995 - September 30, 1996

II. Summary

The overall objectives of the Board on Physics and Astronomy are to identify important new developments at the scientific forefronts, foster interactions with other fields, strengthen connections to technology, and facilitate effective service to the nation. The membership of the BPA is drawn from universities, industry, and national laboratories; it includes leading researchers in physics and astronomy. Meetings are devoted to reviews of activities being carried out under its auspices, discussing critical issues, and developing new initiatives. The BPA sponsors some of its projects directly, but many projects are carried out under the auspices of standing committees dedicated to particular areas of physics and astronomy. In particular, much of the activity in astronomy is carried out by the Committee on Astronomy and Astrophysics (CAA) under the joint auspices of the BPA and the Space Studies Board. The Board completed a number of studies during this reporting period and initiated several others described in more detail below. A major initiative developed during this reporting period is a new decadal survey of astronomy and astrophysics to be issued in AD2000. The new astronomy survey will reinforce established priorities and explore new options for the future.

III. Technical Information

Publications issued by the BPA or its subunits over this period include:

- *Proceedings of the 1996 Solid State Sciences Committee Forum*
- *Database Needs for Modeling and Simulation of Plasma Processing*
- *Biomolecular Self-Assembling Materials*
- *BPA News* (a continuing series of newsletters). The attached issues of the *BPA News* contain detailed information about the BPA's activities during this period. A brochure on the BPA contains further detailed information.

During this reporting period, the BPA met on November 4-5, 1995 and again on April 27-28, 1996. (The BPA also met in November 1996.) A detailed report of the earlier meeting is included in the attached copies of the *BPA News*. At recent meetings, the BPA has reviewed studies in progress, including assessments of (1) elementary-particle physics, (2) condensed-matter and materials physics, and (3) nuclear physics, all part of the ongoing survey of physics,

Physics in a New Era. The next study in the series, to be launched in the next reporting period, will cover ground- and space-based gravitational physics. Other activities reviewed include the optical science and engineering study and the Task Group on Space Astronomy and Astrophysics (under the auspices of the CAA). Plans for a new survey of astronomy and astrophysics were considered and approved. The BPA also discussed preparations for a Physics Survey Overview Report which will synthesize the findings of studies of the branches of physics and discuss overall priorities for the field. General discussion topics included Basic Energy Sciences at DOE, NASA's Mission to Planet Earth (presented by former BPA chair Charles Kennel), and commentary on the changing political scene entitled "A New Generation on the Hill".

IV. Future Plans

Over the next year the BPA plans presentations for key science decision makers on the numerous reports that were completed during this reporting period. The Solid State Sciences Committee will begin planning a forum to be held in 1998. As indicated above, the BPA is in the midst of a new decadal survey of physics. Early results of the survey included research briefings on cosmology and cosmic-ray physics. Newly initiated components of the physics survey with relevance to space science include a study on gravitational physics. Several of the physics studies now in progress will be completed in the next reporting period. Meetings will be convened over the next year to initiate studies in computational and biological physics as well as education in physics. The BPA will begin work on an overview volume of the physics survey which will synthesize the findings of the studies of the branches of physics and look at broad issues which impact the physics community as a whole, including setting priorities for the field. The report of the CAA's Task Group on Space Astronomy and Astrophysics will be issued in the next few months. An Astronomy and Astrophysics Survey Committee will be formed to carry out a new decadal survey of the field to be completed in the year 2000.

V. Estimate of Costs

The Board on Physics and Astronomy is currently supported by the National Aeronautics and Space Administration (NASA) and the National Science Foundation (NSF). The Board funding from NASA expired on September 30, 1996. In order to continue the activities of the Board, a new three-year proposal was submitted to NASA on May 1, 1996 that included an estimate of costs for the next period of activity.

Attachments

- (1) BPA Roster
- (2) December 1995 BPA NEWS
- (3) June 1996 BPA NEWS
- (4) December 1996 BPA NEWS
- (5) BPA Brochure

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COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND APPLICATIONS

2101 Constitution Avenue Washington, D.C. 20418

BOARD ON
PHYSICS AND ASTRONOMY

(202) 334-3520
FAX: (202) 334-3575
INTERNET: BPA@EDU

BOARD ON PHYSICS AND ASTRONOMY

Terms expire on June 30 of year indicated.

David N. Schramm, Chair 1997
Enrico Fermi Institute
University of Chicago
5640 South Ellis Avenue, AAC 140
Chicago, IL 60637
312-702-8202 (2503 Roberta)
Fax: 312-702-8212
Email: dns@oddjob.uchicago.edu

Robert C. Dynes, Vice Chair 1997
Department of Physics
University of California, San Diego
La Jolla, CA 92093
619-534-2047
Fax: 619-534-6523
Email: rcd@ucsd.edu
Eileen: 619-534-3135
Eileen fax: 619-534-4523
eocallahan@ucsd.edu

Ira Bernstein 1998
Department of Mechanical Engineering
and Physics
200 Mason Lab
Yale University
New Haven, CT 06520-8286
203-432-4352
Fax: 203-432-1054

Praveen Chaudhari 1997
T.J. Watson Research Center
IBM Corporation
P.O. Box 218
Yorktown Heights, New York 10598
914-945-1337 (2225 secretary)
Fax: 914-945-4407
Email: petrera@yktvmv or petrera@watson.ibm.com

Steven Chu 1999
Stanford University
Physics Department
Stanford, CA 94305
415-723-3571
FAX: 415-723-9173
Email: schu@leland.stanford.edu

Jerome I. Friedman 1997
Department of Physics
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139
617-253-4801
Fax: 617-253-8554
Email: friedman@mitlns.mit.edu

Margaret Geller 1997
Harvard-Smithsonian Center for Astrophysics
60 Garden Street
Cambridge, MA 02138
617-495-7409
Fax: 617-495-7467
Email: mjg@cfa.harvard.edu

Ivar Giaever 1999
Rensselaer Polytechnic Institute
Department of Physics
(FedEx: School of Science
110 8th St.)
Troy, NY 12180-3590
518-276-6429
Fax: 518-276-2825
Email: giaevi@rpi.edu

William Klemperer 1997
Department of Chemistry
Harvard University
Cambridge, MA 02138
617-495-4094
Fax: 617-495-1792
Email: billk@otto.harvard.edu

Albert Narath 1997
President and Chief Operating Officer
Energy and Environment Sector
Lockheed Martin Corporation
1155 University Boulevard SE
Albuquerque, NM 87106
505-843-4021 (Yolanda -4022)
Fax: 505-843-4041

BOARD ON PHYSICS AND ASTRONOMY

Terms expire on June 30 of year indicated.

Joseph M. Proud 1997
15 Brewster Road
Sudbury, MA 01776
508-443-4923
Fax: 508-443-4923

Anthony C.S. Readhead 1998
California Institute of Technology
105-24
Pasadena, CA 91125
818-395-4972
Fax: 818-568-9352
Email: acr@deimos.caltech.edu

Robert C. Richardson 1997
517 Clark Hall
Cornell University
Ithaca, NY 14853
607-255-6423
Fax: 607-255-6428
Email: rcr2@cornell.edu

R.G. Hamish Robertson 1999
University of Washington
Department of Physics
P.O. Box 351560
Seattle, WA 98195
206-616-2745
Fax: 206-616-2902
Email: rghr@u.washington.edu

J. Anthony Tyson 1999
Lucent Technologies
MH 1D432
600 Mountain Avenue
Murray Hill, NJ 07974
908-582-6028
Fax: 908-582-4702
Email: tyson@bell-labs.com

David Wilkinson 1998
Jadwin Hall
Princeton University
P.O. Box 708
Princeton, NJ 08544-0708
609-258-4406
Fax: 609-258-1124
Email: dtw@pupgg.princeton.edu

NRC Staff

Donald C. Shapero, Director
Email: dshapero@.edu

Robert L. Riemer, Associate Director
Email: rriemer@.edu

Board on Physics and Astronomy
2101 Constitution Avenue
Washington, D.C. 20418
(FedEx: 2001 Wisconsin Ave. NW - HA 562
Washington, DC 20007-2230)
202-334-3520
Fax: 202-334-3575
Email: bpa@.edu